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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,592	11/20/2006	Robert Seth Hartshorne	57,0534 US PCT	3968

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SCHLUMBERGER-DOLL RESEARCH

ATTN: INTELLECTUAL PROPERTY LAW DEPARTMENT

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CAMBRIDGE, MA 02142

EXAMINER

LI, AIQUN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/574,592

Applicant(s)

HARTSHORNE ET AL.

Examiner

AIQUN LI

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-39, 42 and 45-54 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 25-39, 42 and 45-54 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date ____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

1. Claims 25-39, 42 and 45-54 are pending as amended on 8 September 2009, claims 24, 40, 41 and 43-44 being cancelled.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Applicant's amendments to the claims and the remarks/arguments, all filed 8 September 2009, have been entered and fully considered.

Response to Amendment and Arguments

4. Applicant's amendment removes the inconsistency noted previously for claims 32 and 33.

The objection to claims 32 and 33 has been withdrawn.

5. Applicant's amendment, introducing new independent claim 47, which includes the limitation "the surfactant is a solution of worm-like micelles", and changing the dependency of claims 25-39 and 42 to depend upon claim 47, has been fully considered and overcomes the anticipatory rejections over US Patent 6035936 (Whalen); however, as detailed below, it is the examiner's position that the limitation "the surfactant is a

solution of worm-like micelles", is inherent to the claimed composition since Whalen teaches the same composition.

The other new limitation "a salt concentration in the range of more than 0 wt.% to less than 1.0 wt.%" of new claim 47, together with the changing the dependency of claims 25-39 and 42 to depend upon claim 47, overcomes the anticipatory rejections over WO02/06946 (Zhou) of claims 25-33 and 42; however, as detailed below, it is the examiner's position that this limitation is obvious over Zhou.

6. Applicant's arguments have been fully considered but they are not persuasive.

With respect to US Patent 6035936 (Whalen), applicant argues that Whalen fails to teach a salt concentration below 1 wt. %. Although exemplifying with seawater or 2 wt.% potassium chloride, Whalen expressly teaches that the viscoelastic fracturing fluid need only contain an effective amount of any one or more surfactants including anionic surfactants in water (col.4, line 52-55), and the fracturing fluid can be used in both fresh and salt water environment (col. 4, line 25-26). Whalen further teaches the hydrophobic organic alcohol may also have been incorporated into the fracturing fluid mixture prior to the introduction of the salt brine (col.7, line 5-7), therefore Whalen anticipates a composition comprised of water, hydrophobic, organic alcohol and anionic surfactant.

Applicant further argues that Whalen's composition is typically in the form of emulsion. Although silent on the worm-like surfactant micelles, Whalen expressly discloses the composition is a viscoelastic fracturing fluid (col.3, line 5-10 and col.4, line

10-15). Since Whalen teaches the same viscoelastic composition (col. 3, line 5-10) as claimed, the property of the composition such as forming elongate micelles would inherently be the same as claimed. If there is any difference between the product of Whalen and the product of the instant claims the difference would have been minor and obvious. "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See MPEP 2112.01(I) , *In re Best*, 562 F2d at 1255, 195 USPQ at 433, *Titanium Metals Corp v Banner*, 778 F2d 775, 227 USPQ 773 (Fed Cir 1985), *In re Ludtke*, 441 F2d 660, 169 USPQ 563 (CCPA 1971) and *Northam Warren Corp v D F Newfield Co*, 7 F Supp 773, 22 USPQ 313 (EDNY 1934).

With respect to WO02/06946 (Zhou), applicant argues that Zhou fails to teach a composition which contains salt in an amount which is above zero yet is below 2 or below 1 wt. % and is intended for injection below ground. Zhou expressly teaches an aqueous viscoelastic fracturing fluid (page 1, line 4-6), which is intended for injection below ground, may comprise salts in concentration of 1 to 10 wt % (page 18, line 5), which encompass below 2 wt.%. Although Zhou does not teach a salt concentration above zero below 1 wt. %; However such would have been obvious to one of ordinary skill in the art at the time the invention was made since it has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a *prima facie* case of obviousness exists where the claimed

ranges and prior art ranges do not overlap but are close enough, in the instant case, the gap between the claimed range (less than 1%) and the prior art range (1 – 10%) is as close as can be without an overlap, that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05 *Titanium Metals Corp of Am v Banner*, 778 F2d 775, 783, 227 USPQ 773, 779 (Fed Cir 1985).

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05, *In re Boesch*, 617 F2d 272, 205 USPQ 215 (CCPA 1980); *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and *In re Hoeschele*, 406 F2d 1403, 160 USPQ 809 (CCPA 1969).

Applicant further noted that the prior Office Action did not point out disclosure by Zhou of the requirements for the organic compound. On Page 7 of the prior Office Action, the examiner noted " alcohols (page 18, line 7, Example 1) such as isopropanol (page 18, line 8), butanol (page 19, line 11), ethylene glycol(page 19, line 19), oleyl alcohol(page 19, line 19), which reads on the claimed hydrophilic-lipophilic organic compounds with one or more polar groups".

Claim Rejections - 35 USC § 102 & 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. **Claims 25-31, 33-39, 42, 45, 46-49 and 53-54** are rejected under 35

U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being obvious over US Patent No. 6035936 (Whalen) .

Whalen teaches method of fracturing a subterranean formation comprising providing a viscoelastic surfactant fracturing fluid comprised of an anionic viscoelastic surfactant (col.3, line 8; col.4, line 14) including those selected from the group consisting of dicarboxylic acids (col.5, line 25-28), a hydrophobic organic alcohol that is immiscible with water (col.4, line 19) such as ethanol, 2-propanol, 1-octanol, 2-octanol(col.5, line 56, 58), which reads on the claimed compounds composed of a linear carbon chain comprising one polar (OH) groups, 2-ethyl-1-hexanol (col.5, line 59), which reads on the claimed compounds composed of a branched carbon chain comprising one polar (OH) groups, ethylbenzyl alcohol(col.5, line 57), which reads on the claimed compounds composed of a partially unsaturated carbon chain comprising one polar (OH) groups, propanol alcohol ethers (col.5, line 57) which reads on the

claimed organic alcohol with ether group or a diethanol (col.5, line 57); and water (col.4, line 52-55) , which reads on a salt concentration of more than zero to less than 1.0 wt. %, or one water soluble inorganic salt from about 1 wt% to about 4 wt.% based on the total weight of salt and water (col.5, line 61-62 and 65-67).

Whalen further teaches 2-ethyl-1-hexanol alcohol is present at a ratio equal to 20% by volume of the surfactant mixture (Example 1, col.7, line 27), wherein the anionic surfactant dodecylbenzene sulfonic acid (sodium salt) is present at 60% by volume (Example 1, col.7, line 15-16), which is equivalent to a molar ratio of the organic compound to anionic surfactant at 0.72, calculated by the examiner based on the molecular weight of 2-ethyl-1-hexanol (130.23g/mol) and Dodecylbenzene sulfonic acid (sodium salt) (348.5g/mol), and density of 2-ethyl-1-hexanol(0.833g/cm³), Dodecylbenzene sulfonic acid (sodium salt) (1.03 g/cm³), which reads on the claimed molar ratio.

Whalen further discloses the fluid has a viscosity range of 175 cp to 218 cp at 100 s⁻¹ at 66 degree of Celsius (Example I, col.7, line 38), which reads on the claimed viscosity and temperature, and the fracturing fluid is stable at elevated temperatures with high viscosity (col.3, line 1-2 and col.4, line 30-32). The fluid can be further stabilized, and their viscosity increased by the addition of organic alcohols (col.5, line 50-53).

Further, since Whalen teaches the same viscoelastic composition (col. 3, line 5-10) as claimed, the property of the composition such as forming elongate micelles would inherently be the same as claimed. If there is any difference between the product

of Whalen and the product of the instant claims the difference would have been minor and obvious. "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See MPEP 2112.01(I) , *In re Best*, 562 F2d at 1255, 195 USPQ at 433, *Titanium Metals Corp v Banner*, 778 F2d 775, 227 USPQ 773 (Fed Cir 1985), *In re Ludtke*, 441 F2d 660, 169 USPQ 563 (CCPA 1971) and *Northam Warren Corp v D F Newfield Co*, 7 F Supp 773, 22 USPQ 313 (EDNY 1934).

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 USC 102 and 103. "There is nothing inconsistent in concurrent rejections for obviousness under 35 USC 103 and for anticipation under 35 USC 102." See MPEP 2112(III) and *In re Best*, 562 F2d at 1255, 195 USPQ at 433.

10. **Claim 45** stands rejected under 35 U.S.C. 102(b) as being anticipated by WO02/064946 (Zhou).

Zhou teaches a method for use in the recovery of hydrocarbons, in particular for use as a fracturing fluid (page 1, line 4-6) comprises providing downhole an aqueous viscoelastic fluid (page 4, line 20-24) comprising a viscoelastic surfactant (page 8, line

29-30) that may be cationic, anionic or zwitterionic (page 9, line 9-10) such as N-erucyl-N, N-bis (2-hydroxyethyl)-N-methyl ammonium chloride (page 10, line 20-21), oleate, di- or oligomeric carboxylates (page 10, line 28-30), wherein the viscoelastic surfactant forms a gel containing worm-like micelles (page 10, line 20-25), organic solvent such as isopropanol (page 18, line 8), butanol (page 19, line 11), ethylene glycol (page 19, line 19), oleyl alcohol (page 19, line 19), which reads on the claimed hydrophilic-lipophilic organic compounds with one or more polar groups; and optionally salts including inorganic salts such as ammonium, sodium or potassium chlorides present in concentrations of 1 to 10 wt% and typically 3 to 4 wt.% (page 18, line 1-10).

11. **Claims 25-39, 42 and 47-52** are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou.

Zhou teaches a method for use in the recovery of hydrocarbons, in particular for use as a fracturing fluid (page 1, line 4-6) comprises providing downhole an aqueous viscoelastic fluid (page 4, line 20-24) comprising a viscoelastic surfactant (page 8, line 29-30) that may be cationic, anionic or zwitterionic (page 9, line 9-10) such as N-erucyl-N, N-bis (2-hydroxyethyl)-N-methyl ammonium chloride (page 10, line 20-21), oleate, di- or oligomeric carboxylates (page 10, line 28-30), wherein the viscoelastic surfactant forms a gel containing worm-like micelles (page 10, line 20-25), organic solvent such as isopropanol (page 18, line 8), butanol (page 19, line 11), ethylene glycol (page 19, line 19), oleyl alcohol (page 19, line 19), which reads on the claimed hydrophilic-lipophilic organic compounds with one or more polar groups; an amphiphilic compound (page 4,

line 32-33) such as ester carboxylates (page 11, line 31), reverse and forward amide carboxylates (page 11, line 34-35); and optionally salts including inorganic salts such as ammonium, sodium or potassium chlorides present in concentrations of 1 to 10 wt% and typically 3 to 4 wt.% (page 18, line 1-10).

Zhou further teaches the surfactant is monocarboxylate such as oleate, or di- or oligomeric carboxylates (page 10, line 29-31); a compound of the formulae $R-X-Y-Z$ (page 9, line 35 and page 10, line 1), where R is the hydrophobic tail of the surfactant (page 10, line 4), Z is the hydrophilic head group of the surfactant which can be $-SO_3^-$, $-COO^-$ (page 10, line 12), X is an acetal, amide ether or ester bond (page 10, line 7-8), which reads on the disclosed stabilizing group, Y is a spacer group which is constituted by a short saturated or partially saturated hydrocarbon chain of n carbon atoms where n is at least equal to 1, preferably 2 and, when n is ≥ 3 , it may be a straight or branched alkyl chain (page 10, line 8-12), which reads on the claimed Y.

Zhou further exemplifies the alcohol such as isopropanol is present at 25 wt.% while the surfactant such as N-erucyl-N, N-bis (2-hydroxyethyl)-N-methyl ammonium chloride is present at 75 wt. % (page 19, line 5-15), which is equivalent to a ratio of organic compound to surfactant at 2.6 calculated by the examiner.

Zhou does not teach a salt concentration above zero below 1 wt. %; However such would have been obvious to one of ordinary skill in the art at the time the invention was made since it has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a *prima facie* case of

obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough, in the instant case, the gap between the claimed range (less than 1%) and the prior art range (1 – 10%) is as close as can be without an overlap, that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05 *Titanium Metals Corp of Am v Banner*, 778 F2d 775, 783, 227 USPQ 773, 779 (Fed Cir 1985).

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05, *In re Boesch*, 617 F2d 272, 205 USPQ 215 (CCPA 1980); *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and *In re Hoeschele*, 406 F2d 1403, 160 USPQ 809 (CCPA 1969).

Further, specifically for claims 35-39, since Zhou teaches the same viscoelastic composition as claimed, the property of the composition such as viscosity would intrinsically be the same as claimed. If there is any difference between the product of Zhou and the product of the instant claims the difference would have been minor and obvious. "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See MPEP 2112.01(I) , *In re Best*, 562 F2d at 1255, 195 USPQ at 433, *Titanium Metals Corp v Banner*, 778 F2d 775, 227 USPQ 773 (Fed Cir 1985), *In re Ludtke*, 441 F2d 660, 169 USPQ 563 (CCPA 1971) and *Northam Warren Corp v D F Newfield Co*, 7 F Supp 773, 22 USPQ 313 (EDNY 1934).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AIQUN LI whose telephone number is (571)270-7736. The examiner can normally be reached on Monday -Thursday, 9:30 am - 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on (571)2721498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AL/

/Timothy J. Kugel/
Primary Examiner, Art Unit 1796